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The effect of part-time sick leave for employees with mental disorders

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Abstract

Previous studies find that part-time sick-listing it is an effective instrument for reducing sick leave durations for employees with musculoskeletal disorders and for sick-listed employees in general. This paper provides new evidence by studying whether the Danish part-time sick leave programme reduces the duration until employees with mental disorders end their sick leave by reporting ready for returning to regular working hours. The programme allows fully sick-listed employees to resume work at reduced hours. When the sick-listed employee's health improves, working hours are increased until the employee is able to work regular hours. We use combined survey and register data about 226 long-term sick-listed employees with mental disorders and 638 employees with physical disorders. Our analyses show that part-time sick-listing significantly reduces the duration until returning to regular working hours for employees with physical disorders. In contrast, we find that part-time sick-listing does not reduce durations for employees with mental disorders. The analyses also illustrate the importance of adjusting for unobserved differences between part-time sick-listed and full-time sick-listed. Without such adjustment part-time sick-listing significantly reduces the duration until returning to regular working hours. When we adjust for unobserved characteristics this effect decreases, and for sick-listed employees with mental disorders the effect vanishes entirely. The lack of an effect for these employees suggests that employers and colleagues may be less supportive of and more uncomfortable with employees with mental disorders than with employees with physical disorders. Furthermore, mental disorders are often more diffuse and 'invisible' than physical disorders, possibly making accommodating a colleague with a mental disorder more difficult than a colleague suffering from physical disorders.

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INTRODUCTION

In many countries people are increasingly exiting the labour force because of mental disorders. From 1990 to 2008 the majority of OECD countries experienced a significant growth in the proportion of disability benefits awarded to people with mental diagnoses (OECD, 2010). This development not only reduces the labour supply and impounds considerable resources to the financing of social security benefits it also reduces the welfare of the individuals suffering from long-term mental disorders. Today's social security systems are not well designed for handling the increasing problems of mental disorders. The systems were designed to provide services and incentives to strengthen the labour market attachment of people with musculoskeletal disorders, whereas services and incentives are lacking for those with mental disorders (OECD, 2010). Politicians have limited possibilities for implementing effective changes to alleviate these deficits, because knowledge about the effects of interventions preventing premature labour market exit for those with mental disorders is limited (van Oostrom, Driessen, de Vet, Franche, Schonstein et al., 2009; Borg, Nexø, Kolte & Andersen, 2010).

Evidence from the literature about musculoskeletal disorders suggests that workplace interventions increase sick-listed employees' chance of returning to work (Krause, Dasinger & Neuhauser, 1998; Krause & Lund, 2003; Franche, Cullen, Clake, Irvin, Sinclair et al., 2005; van Oostrom et al., 2009). In line with this literature studies indicate that part-time sick leave reduces sick leave durations for employees with musculoskeletal disorders (Andrén & Svensson, 2009) and for sick-listed employees in general (Andrén & Andrén, 2008; Markussen, 2009; Høgelund, Holm & McIntosh, 2010). In contrast, the effect of workplace interventions for employees with mental disorders such as stress and depression has been assessed only in relatively few studies (Borg et al., 2010), and so far no one has studied the effect of part-time sick leave programmes. Therefore, whether part-time sick-listing is an instrument that reduces sick leave durations of employees with mental disorders remains an open question.

This paper studies whether a national part-time sick leave programme reduces sick leave durations for employees primarily suffering from either depression or stress-related conditions. More precisely, we study whether part-time sick-listing reduces the duration until employees with mental disorders end their sick leave by reporting ready to return to regular working hours. Furthermore, we compare the effect for these employees with the size of the programme effect for sick-listed employees with physical disorders. We use combined survey and register data of 864 long-term sick-listed employees with mental disorders (226) or physical disorders (638).

The part-time sick leave programme allows fully sick-listed employees to work temporarily at reduced working hours. As the employee's working ability improves, the working hours are gradually increased until the employee is capable of resuming regular working hours, i.e. pre-sick leave hours. During the part-time sick leave, the sick-listed employee receives his or her normal hourly wage for the hours worked and sickness benefit for the hours off work. The sick-listed employee is expected to return to regular working hours as quickly as possible.

Controlling for of unobserved differences between part-time sick-listed and full-time sick-listed employees, we find that part-time sick-listing does not reduce the duration until employees with mental disorders return to regular working hours. In contrast to this result, we find in line with previous research that part-time sick-listing significantly reduces the duration for employees sick-listed with physical disorders. In other words, our results suggest that while part-time sick-listing is an effective measure for employees sick-listed with physical disorders, it is not for employees with mental disorders.

This paper is structured as follows. The following section describes the Danish sick leave policy. The next section discusses possible employment effects of the part-time sick leave programme, followed by our outlining the empirical strategy and describing our data and the variables included in our analysis. The next section shows descriptive results and the results of our empirical model. The paper concludes with a discussion.

THE DANISH SICK LEAVE POLICY

The Danish Sickness Benefit Act covers the self-employed, wage earners, and persons receiving unemployment benefits. Eligibility demands that the sick-listed individual is partly or fully unable to work because of illness, and wage earners must have already worked at least 120 hours within 13 weeks before they are entitled to the benefit.

The sickness benefit replaces wages up to a ceiling corresponding to approximately two-thirds of the wage of an average production worker (our calculation from Hansen, 2006). While benefits can normally be received for a maximum of 52 weeks within 18 months, the benefit period can be extended if one of six conditions is fulfilled, e.g. if it is likely that ongoing medical treatment or planned vocational rehabilitation will enable the sick-listed employee to resume work.

Benefits are financed by the employer for the first three weeks and by the state and municipalities for the remaining period. The programme is administered by the municipality, which is obliged to perform a follow-up assessment of all sickness benefit cases within the first eight weeks of the sick leave. Thereafter, assessments must take place every fourth week in complex cases or every eighth week in uncomplicated cases. These assessments, which must take place in cooperation with the sick-listed individual, rely on updated medical, social and vocational information.

To promote a swift return to work, the municipal case manager can apply various vocational rehabilitation measures, including part-time sick leave, courses, education, support for workplace accommodation, and wage-subsidised job training. During participation in long-lasting measures such as education, the sick-listed employee receives a vocational rehabilitation benefit. This benefit equals the sickness benefit and can be received for up to five years.

If a sick-listed employee with permanently reduced working capacity cannot return to ordinary employment after participation in vocational rehabilitation, the municipality may refer him or her to a permanent wage-subsidised job (*flexjob*). In these jobs the job demands are adjusted to the sick-listed employee's working capacity, e.g. reduced working hours, adapted working conditions, and light duties. When a sick-listed employee is unable to work in a *flexjob*, he or she is eligible for a state financed disability benefit.

In general, the municipalities have economic incentives for implementing an active and employment-oriented policy. As the municipalities' expenditures are reimbursed by the state to varying degrees, 'active' expenditures for, for example, vocational rehabilitation and *flexjobs* are reimbursed at higher rates than 'passive' expenditures for disability benefit and social assistance. The reimbursement system also provides the municipalities with incentives for reducing sickness benefit expenditures. For example, the municipalities are entitled to reimbursement of sickness benefit cases lasting less than 52 weeks, whereas the municipalities have to fully finance cases above 52 weeks. In addition to these incentives, the economic structures prompt the municipalities to use part-time sick-listing instead of full-time sick-listing, because the municipalities' expenditures for a part-time sick-listed person are lower than those for a fully sick-listed person.

PART-TIME SICK LEAVE AND POSSIBLE EFFECTS

If a fully sick-listed employee, the employer, and the municipality agree, the employee can become part-time sick-listed. The employer and the employee must make an agreement about the job contents and working hours, and the municipality must approve this agreement. During part-time sick leave the employee receives the normal hourly wage for the hours worked and sickness benefit for the hours off work. The sick-listed employee may (but is not mandated to) gradually increase the working hours until he or she is able to work regular hours. The municipality must monitor the part-time sick leave and make sure that the employee returns to regular working hours as quickly as possible. A part-time sick leave usually cannot last longer than the statutory one-year sickness benefit period.

Previous studies suggest that part-time sick leave reduces sick leave duration for individuals with musculoskeletal disorders (Andrén & Svensson, 2009) and for sick-listed individuals in general (Andrén & Andrén, 2008; Markussen, 2009; Høgelund et al., 2010).

As mental disorders differ from other types of disorders in certain respects (Thornicroft, Brohan, Kassam & Lewis-Holmes, 2008), the effect of part-time sick-listing may be lower for employees with mental disorders. People with mental disorders often feel stigmatised at work (Thornicroft et al., 2008), and both employers and employees are more uncomfortable working with employees with mental disorders than with employees with physical disorders (Scheid, 2005; Jones & Stone, 1995; Miiller, Høgelund & Geerdsen, 2006; Schademan, Jensen, Thuesen & Holt, 2008). Consequently, there may be resistance at the workplace towards employees with mental disorders attempting to return to work, and the employer and colleagues may be less supportive of part-time sick-listed employees with mental disorders than of other part-time sick-listed employees.

Mental disorders often are also more diffuse and ‘invisible’ than musculoskeletal disorders (Briand, Durand, St-Arnaud & Corbiére, 2007). Therefore, employees may find it more difficult to cooperate with colleagues with mental disorders than with those suffering from physical health problems. Thus, problems with workplace resistance and the diffuseness of mental disorders may reduce the effect of part-time sick leave for people with mental disorders.

In sum, previous studies find that part-time sick-listing reduces sick leave duration for individuals with physical disorders and for sick-listed individuals in general. However, distinct characteristics of mental illness may mean that the return-to-work effect of part-time sick-listing is lower for employees with mental disorders than for others.

EMPIRICAL STRATEGY

To study the effect of part-time sick leave on sick leave durations, we model two durations: the duration until part-time sick-listing and the duration until the sick-listed employee ends the sick leave by reporting ready for return to regular working hours (for convenience we label this duration 'the duration to returning to regular working hours'). We use a discrete-time multivariate mixed-proportional-hazard-rate (MMPHR) model similar to the model that Høgelund et al. (2010) use (they provide a more mathematical presentation of the application of the MMPHR model to the part-time sick-listing setting than the presentation in this section). This model is well suited for measuring the causal effect of various treatments (Abbring & van den Berg, 2003; 2004a). The model simultaneously estimates the duration until part-time sick-listing, t_1, and the duration until the employee returns to regular working hours, t_2. We use a logistic specification to describe the hazard rate at a particular week to part-time sick-listing (PS) and to regular working hours (RH). A high hazard rate corresponds to a short duration. Throughout the paper we use the terms 'duration until' and 'probability of' returning to regular working hours interchangeably. The model consists of two equations:

$$\ln\left(\frac{P\left(PS=1,T_1=t_1 \mid T_1 \geq t_1\right)}{P\left(PS=0,T_1=t_1 \mid T_1 \geq t_1\right)}\right)=\alpha_{PS,t_1}+\beta_{1,PS}X+v_{PS} \quad (1)$$

$$\ln\left(\frac{P\left(RH=1,T_2=t_2 \mid T_2 \geq t_1\right)}{P\left(RH=0,T_2=t_2 \mid T_2 \geq t_1\right)}\right)=\alpha_{RH,t_2}+\beta_{1,RH}X+\gamma_{1,RH}PS_{E,t_1}+\gamma_{2,RH}PS_{C,t_1}+v_{RWH} \quad (2)$$

The probability of being part-time sick-listed during a particular week depends on some time-invariant socioeconomic variables and a component capturing unobserved heterogeneity (random effects), v_{PS}. The time-invariant intercept term $\alpha_{PS,t}$ measures the duration dependence in the hazard rate to part-time sick-listing.

The probability of returning to regular working hours on a particular week depends on the time-invariant intercept term, α_{RH,t_2}, the socioeconomic variables, X, whether the sick-listed employee is part-time sick-listed, PS_P, and whether the employee has ended part-time sick-listing, PS_E. To study whether the effect of part-time sick-listing for employees with mental disorders is different from the effect for employees sick-listed with physical disorders, we estimate the model separately for sick-listed employees with mental disorders and sick-listed employees with physical disorders.

As is customary in random effects models, we assume that the random effects v_{PS} and v_{RWH} are independent of observed variables (Abbring & van den Berg, 2004b). We further assume that v_{PS} and v_{RWH} take on a finite number of values (Heckman & Singer, 1984; van den Berg, Holm & van Ours, 2002), where the first is (0,0) and the following $(v_{PS,2}, v_{RWH,2}),(v_{PS,3}, v_{RWH,3}),\ldots,(v_{PS,J}, v_{RWH,J})$, where *J* is the number of pairs of discrete values (mass points). These values are distributed with probabilities p_1, p_2, p_3,…, p_J that sums to one. The probabilities and values (mass points) are estimated in the model from the data. Hence their magnitude and importance are an empirical matter. We allow the random effects in equation (1) to be correlated with the random effects in equation (2), meaning that we jointly determine the selection to part-time sick leave and to regular working hours. We do so because when we estimate the probabilities, the p_j's, and the mass points, the $v_{PS,j}$'s and the, $v_{RWH,j}$'s, $j = 2,...J$, we simultaneously allow v_{PS} and v_{RWH} to be correlated because the position in the v_{PS} and v_{RWH} space are determined by the data. When we only have two mass points (0 and estimated value in each dimension), the correlation will be -1 or 1. But in principle, allowing for more mass points will allow for a less deterministic interdependence between v_{PS} and v_{RWH}. In sum, the model estimates the effect of part-time sick-listing after correction for both observed and unobserved characteristics affecting the selection to part-time sick leave.[1]

Abbring and van den Berg (2003, 2004a) show that the MMPHR model yields an unbiased estimate of the treatment effect when individuals cannot anticipate the exact timing of their participation in the treatment. In our case, this result means that the estimated effect of part-time sick-listing on the probability of returning to regular working hours will be unbiased if the sick-listed employees, at the beginning of their sick leave, cannot foresee exactly when they become part-time sick-listed. Roughly speaking, a sick-listed employee may know the distribution of the duration of part-time sick-listing, but the employee should not know whether the part-time sick leave will begin in a specific week. This no-anticipation assumption means that some exogenous

[1] In addition, a selection out of part-time sick-listing may potentially bias the estimated effect of part-time sick-listing. However, relatively few persons end their part-time sick leave (and thus report fully sick-listed again) before returning to regular working hours, meaning that we were unable to estimate this selection from our data. Part-time sick-listed employees ending their part-time sick leave without having resumed regular working hours will probably have fewer unobserved resources than employees going directly from part-time to regular working hours. Consequently, we may underestimate the effect of ending a part-time sick-listing.

variation exists in the duration until part-time sick-listing, beyond the duration that the sick-listed employees anticipate. The quasi-experimental variation allows us to identify the effect of part-time sick-listing without exclusion restrictions (instrumental variables).

Following Høgelund et al. (2010), we argue that the no-anticipation assumption is credible. Thus it is unlikely that sick-listed employees are able to foresee their future health status with such precision that they can determine when they are capable of working part-time. Moreover, a sick-listed employee cannot become part-time sick-listed without the consent of the employer and the municipality, nor can the employers or the municipality legally force the sick-listed into becoming part-time sick-listed. In other words, the way that part-time sick-listing is established by definition involves an uncertainty that makes it impossible for the sick-listed employee to foresee the exact timing. Empirically the no-anticipation assumption is supported by Figure 1 (in 'Results'), showing the hazard rate to part-time sick-listing for sick-listed employees with and without mental disorders. The graphs are non-monotonic suggesting that the sick-listed employees are unable to foresee precisely the timing of their part-time sick-listing.

DATA AND VARIABLES

Data

We use survey data linked to register data about employees who were sick-listed over eight weeks. The data was collected for studying the Danish municipalities' case management of long-term sickness benefit cases and its effect on the sick-listed individuals' labour market attachment (Høgelund, Boll, Skou & Jensen, 2008).

The total sample covers 1,220 sickness benefit cases that were closed from 1 January through 31 July 2006. The benefit cases were randomly drawn from 39 out of 271 municipalities that were stratified with respect to size and geographical location. Caseworkers in the 39 municipalities were asked to answer a small questionnaire about various case management activities for each of the 1,220 sick-listed employees. From these data we have information about part-time sick leave spells and the type of disorder causing the sick-listing. We obtained case management information for 1,086 individuals (89%).

We gathered register data for 1,083 out of the 1,086 sick-listed employees from two sources. From the national register of payments of sickness benefits (KMD) we gathered information about the first and the last day of the sick leave and the reason for benefit closure. From Statistics Denmark we collected data about socioeconomic characteristics such as educational attainment, previous labour market experience, and the number of visits to general practitioners and medical specialists, respectively, the year before the beginning of the sick leave.

These sick-listed employees were interviewed by telephone from March through May 2007, on average ten months after their benefit case ended (and the payment of sickness benefit ceased) and 19 months after they were sick-listed. Eight hundred and sixty-one of the sick-listed employees participated in the interview (79%). When information from the caseworker questionnaire about the type of disorders are missing, we use information from the interview data (see the section on explanatory variables).

Altogether we have municipality information about case management activities and register information for 1,083 persons. When we exclude employees above 59 years, employees with inconsistent information about part-time sick leave, employees who were not full-time sick-listed at the beginning of their sick leave, and employees without information about the type of disorder, we have 864 sick-listed employees in our analysis: 226 with mental disorders and 638 with physical disorders.

From the total sample, we have register data for 1,214 of the 1,220 sick-listed employees. Using these data, we have performed a simple logistic non-response regression analysis (results not shown). This analysis shows that middle-aged employees and employees with little previous employment experience are significantly overrepresented among the 864 sick-listed employees in our data (insignificant variables at a 5% significance level are sex, educational background, the number of visits to general practitioner the year before the present sick leave, and the number of visits to medical specialists the year before the present sick leave). Consequently, to control for sample selection, we include age and employment experience in our analyses.

Dependent variable

We use KMD's register of payments of sickness benefits to measure the time until first return to regular working hours. In addition to information about the timing of benefit termination, the register also contains information about the reason for ending benefit payment. We consider a

person to have returned to regular working hours when benefit payment ended because the sick-listed employee reported ready to work pre-sick leave hours. This indirect measurement may introduce measurement error.

We code sickness benefit cases where benefit payment are terminated for all other reasons as right censored when benefit payment ends. Other reasons comprise receipt of disability benefit, *fleksjob* employment, exhaustion of the normal one-year sickness benefit period, participation in vocational rehabilitation, temporary suspension of benefit payment because of holidays, and termination because the municipality decides that the sick-listed employee is not work-incapacitated.

Explanatory variables

We use the municipal survey data to construct two graded return-to-work variables. One variable measures whether the individual becomes part-time sick-listed. The variable is coded as 0 until the part-time sick leave spell starts, 1 during the spell, and 0 after the spell has ended (and the employee reports full-time sick-listed again). Another variable measures whether the employee has ended the part-time sick-leave spell. The variable is 0 until the part-time sick-leave spell ends and 1 afterwards.

We use a combination of the case management data and the interview data to measure whether the sick leave was caused by a mental disorder. When the municipality receives information from an employer about a sick-listed employee (the employer must notify the municipality about all sick-listed employees within four weeks after the first day of the sick leave) the municipality requests the sick-listed employee to answer a small questionnaire. Among other things, the sick-listed employee must describe the type of health problem causing the sick leave. We have recoded this description into a dummy variable for mental disorder (this coding was performed by a medical doctor, using WHO's International Classification of Diseases, ICD-10). The municipal survey contains valid disorder information for 679 of the 864 individuals in our sample (73%).

For the 185 individuals without case-management-based information about the type of disorder, we use data from the interview with the sick-listed employees, where they retrospectively stated whether the sick leave was caused by mental disorders, musculoskeletal disorders, or 'other' . Of the 864 sick-listed employees 26% (226 persons) are sick-listed with mental disorders.

In addition to the measure of mental disorder, we include two health proxies that are measured the year before the present sick leave: the number of visits to general practitioners and medical specialists, respectively. The socioeconomic characteristics are gender, age, educational background and previous employment experience, measured as the number of full-time equivalent years of employment since 1964. These register variables are also measured for the year before the sick leave.

We also include the regional unemployment rate as a proxy for regional labour market demand fluctuations, which may influence the probability of returning to work (and of part-time sick-listing). This time-varying variable is measured as the lagged unemployment rate, i.e. the average of the unemployment rate in the two quarters before the beginning of a sick leave spell may affect the probability of returning to regular working hours during the first 26 weeks of the sick leave. Similarly, the average unemployment rate during the two first quarters of the sick leave spell is allowed to affect the probability of returning to regular working hours during the next 26 weeks, etc.

RESULTS

Descriptive results

Figure 1 shows the unadjusted hazard rates to part-time sick-listing for employees with mental disorders and employees suffering from physical disorders.

>>> Figure 1 <<<

The graphs for employees with mental disorders and physical disorders have the same shape: the hazard to part-time sick-listing for both groups rises during the first 8 to 10 weeks and remains at a relatively high level until the 20th week. Thereafter, the hazard decreases until the 22nd week, remaining at a low level during the reminder of the observation period.

Figure 2 displays the unadjusted hazard rates to regular working hours for part-time and full-time sick-listed employees suffering from mental disorders. The figure suggests that part-time sick-listing has a positive effect on the hazard to regular working hours, i.e. it reduces the duration until

the employee reports ready to work regular hours. Thus the hazard to regular working hours appears to be higher for part-time than for full-time sick-listed employees, especially from the 12th through the 17th week. Similarly, Figure 3 clearly suggests that part-time sick-listing has a positive effect on the hazard to regular working hours for sick-listed employees with a physical disorder.

Our graphical assessment of the treatment effect suffers from two other shortcomings. First, the graphs do not adjust for observed and unobserved differences between part-time sick-listed and full-time sick listed employees. Consequently, the graphs may show a biased effect. Several observed differences exist between part-time and full-time sick-listed employees (tables 1 and 2), especially for employees with physical disorders. Part-time sick-listed employees with physical disorders are more often female, are older, are more often better educated, and have more previous employment experience (table 2). If these characteristics also affect the probability of returning to full working hours, they will bias the estimated effect of part-time sick-listing. In contrast, a look at the employees with mental disorders reveals that the only significant differences concern gender and educational attainment.

Both the physically sick-listed and the mentally sick-listed may also be different from their part-time sick-listed counterparts on unobserved characteristics. Such differences obviously also distort an assessment of the treatment effect of the part-time sick-listed, if we base the assessment on an inspection of the figures. Our statistical model takes these problems into account. Second, Figures 2 and 3 do not take into account that some part-time sick-listed employees report fully sick-listed before they return to regular working hours. Consequently, the graphs express an average effect of being part-time sick-listed and of having ended the part-time sick leave without returning to regular working hours.

Results of empirical model

Table 3 shows the results of two proportional hazard rate models: one for employees with mental disorders and one for other employees. The two models do not adjust for unobserved differences between part-time and full-time sick-listed employees.

With respect to the selection of employees with mental disorders to part-time sick-listing, column I shows that women and employees with a lot of employment experience become part-time sick-listed relatively often. With the exception of the number of previous visits to medical specialists, all the individual characteristics affect the selection to part-time sick-listing of employees with physical disorders (column III). In addition to women and employees with a lot of

employment experience, employees of middle age, employees with a secondary or postsecondary education, and employees with few previous visits to the general practitioner often become part-time sick-listed. As sick-listed employees with a lot of employment experience, few previous visits to the general practitioner, and postsecondary education have a high hazard to regular working hours, we conclude that sick-listed employees with good employment prospects relatively often become part-time sick-listed (column IV). A similar selection process does not apply to employees with mental disorders, i.e. none of the observed individual characteristics influence the hazard to regular working hours (column II). One could argue that the insignificance of many of the variables in the model for mental disorders is partly due to the small sample size. However, comparing the model for mental disorders with the model for physical disorders shows that, with a few exceptions, the insignificance is due more to small estimated effects than to large standard errors. Thus we conclude that the reason for the smaller number of significant variables in the model for mental disorders is primarily due to the lower predictive power of the variables than to low statistical power.

Turning to the effect of part-time sick-listing, we see that part-time sick-listing has a positive and significant effect on the hazard to regular working hours for both sick-listed employees with mental disorders and physical disorders. For employees with mental disorders the coefficient of being part-time sick-listed is 0.454 with a p-value of 0.021, whereas the coefficient of having ended part-time sick-listing without having returned to regular working hours is insignificant at a 10% significance level. For employees with physical disorders, the coefficient of being part-time sick-listed is 0.694 with a p-value of 0.000. Furthermore, the coefficient of ending part-time sick-listing is also positive and significant at a 5% significance level, i.e. a coefficient of 0.566 with a p-value of 0.049.

<<< Table 3 >>>

To adjust for unobserved differences between part-time and full-time sick-listed employees, we estimate two mixed-proportional-hazard-rate (MMPHR) models. Table 4 shows the results of a model for employees with mental disorders and a model for employees with physical disorders.

The observed variables affect the selection to part-time sick-listing in the same way as in the model without adjustment for unobserved characteristics: gender and employment experience significantly influence the selection of employees with mental disorders, and gender, age,

educational background, employment experience, and the number of previous visits to the general practitioner affect the selection of employees with physical disorders.

The coefficients and p-values of the random effects suggest that unobserved variables have a massive impact on both the selection to part-time sick-listing and the hazard to regular working hours. This influence is present for employees with mental disorders and for employees with physical disorders. In both cases some of the part-time sick-listed employees have a very low hazard to regular working hours. If this selection is not considered, the effect of part-time sick-listing will be overestimated.

Among the employees with mental disorders 6% have unobserved characteristics that significantly reduce the hazard to both part-time sick-listing and to regular working hours, i.e. the coefficient to part-time sick-listing is -1.447 with a p-value of 0.009 and the coefficient to regular working hours is -3.174 with a p-value of 0.000. In other words, this group has a hazard rate to regular working hours that is only 4% of the hazard rate of the reference group (comprising 94% of employees with mental disorders). Of the sick-listed employees with physical disorders 73% have unobserved characteristics that significantly reduce the hazard to both part-time sick-listing and regular working hours. The coefficient to part-time sick-listing is -0.961 with a p-value of 0.007, and the coefficient to regular working hours is -3.030 with a p-value of 0.000. This group has a hazard rate to regular working hours that is only 5% of the reference group's hazard rate.

<<< Table 4 >>>

When we correct for the selection on unobserved characteristics the effect of part-time sick-listing decreases significantly. For employees with mental disorders the coefficient of being part-time sick-listed decreases from 0.454 to -0.123 and is now completely insignificant with a p-value of 0.606. The coefficient of ending part-time sick-listing decreases from 0.240 (p-value of 0.563) to 0.018 (p-value of 0.970). In other words, our analysis suggests that part-time sick-listing does not improve long-term sick-listed employees' chance of returning to regular working hours. The reason that the effect of part-time sick-listing *appears* significant in the less sophisticated analysis is due to selection effects on unobserved variables.

For sick-listed employees with physical disorders the highly significant coefficient of being part-time sick-listed of 0.694 decreases to 0.442, and it is now significant at a 5% significance level (p-value of 0.034). The coefficient of ending part-time sick-listing decreases from 0.566 to 0.436,

and it is now insignificant at a 10% significance level (p-value of 0.173). Thus, although the coefficients decrease when we adjust for unobserved factors, the evidence supports the hypothesis that part-time sick-listing has a positive effect for sick-listed employees with physical disorders. This finding is in line with Andrén and Svensson (2009), who find that part-time sick-listing has a positive effect for sick-listed employees with musculoskeletal disorders.

In sum, while our analysis indicates that part-time sick-listing increases the probability of returning to regular working hours for sick-listed employees with physical disorders, the analysis does not support that part-time sick-listing is an effective instrument for employees with mental disorders.

Therefore, the analysis supports the hypothesis that the uniqueness of mental disorders in terms of workplace resistance and invisibility counteracts possible positive effects of part-time sick-listing.

CONCLUSION AND DISCUSSION

Previous studies find that part-time sick-listing reduces sick leave durations for employees with musculoskeletal disorders (Andrén & Svensson, 2009) and for sick-listed employees in general (Andrén & Andrén, 2008; Markussen, 2009; Høgelund et al., 2010). This paper is the first to study whether part-time sick-listing also has a positive effect for employees with mental disorders. We used combined survey and register data for 226 long-term sick-listed employees with mental disorders and 638 employees with physical disorders. Our outcome variable was the sick leave duration measured as the duration until the sick-listed employees end the sick leave by reporting ready for returning to regular working hours. To account for unobserved heterogeneity we estimated a multivariate mixed-proportional-hazard-rate model separately for employees with and without mental disorders.

To identify the effect of part-time sick-listing, we used the timing-of-event approach, assuming that the sick-listed employees, at the beginning of the sick leave, are unable to foresee exactly when they become part-time sick-listed. We argued that this assumption is fulfilled because the employees must make an agreement about the part-time sick-listing with their employer and the municipality and because it is unlikely that employees who have just fallen ill can foresee when their health condition will enable them to become part-time sick-listed.

We find that part-time sick-listing significantly increases the probability of reporting ready for returning to regular working hours for employees with physical disorders, a finding in line with Andrén and Svensson (2009). In contrast, we find that part-time sick-listing has no effect on the probability of returning to regular working hours for employees with mental disorders. Thus the results support the hypothesis that resistance in the workplace towards employees with mental disorders or the possible invisibility of mental disorders counteracts the positive effect of part-time sick-listing. Furthermore, the analyses underline how unobserved characteristics can alter the conclusion of an analysis. Without correction for unobservables we find a strong and significant effect of part-time sick-listing for employees with mental disorders. However, this effect disappears after we correct for unobserved characteristics.

While this study benefited from municipality-based data about payments of sickness benefits, case management activities, and baseline information about the type of disorder, some limitations apply. First, the study is based on relatively few sick-listed employees with mental disorders, i.e. 226 employees. Second, we use self-reported information about the type of disorder. Third, our data allow us only to indirectly measure whether the sick-listed employees returned to regular working hours, i.e. we assumed that a sick-listed employee returned to regular working hours when the payment of sickness benefit ended because the employee *reported* ready to work pre-sick leave hours. Finally, our study population was restricted to workers sick-listed for more than eight weeks, a restriction that may also have biased the estimated treatment effect. The solution to this problem could be to collect data when the workers have been sick-listed for a short period, e.g. two weeks. However, doing so would demand a huge sample, because the lion's share of sick-listed workers would return to work shortly after inclusion in the study without having entered the programme.

Future studies could benefit from bigger data sets, data with information about realised return to regular working hours, data with disorder information based on medical assessments, and data including short sick leave durations. Studies assessing the effect of part-time sick-listing for employees with mental disorders can go hand-in-hand with qualitatively oriented studies that can shed light on workplace mechanisms that may counteract the potential positive effects of part-time sick-listing for sick-listed employees with mental disorders.

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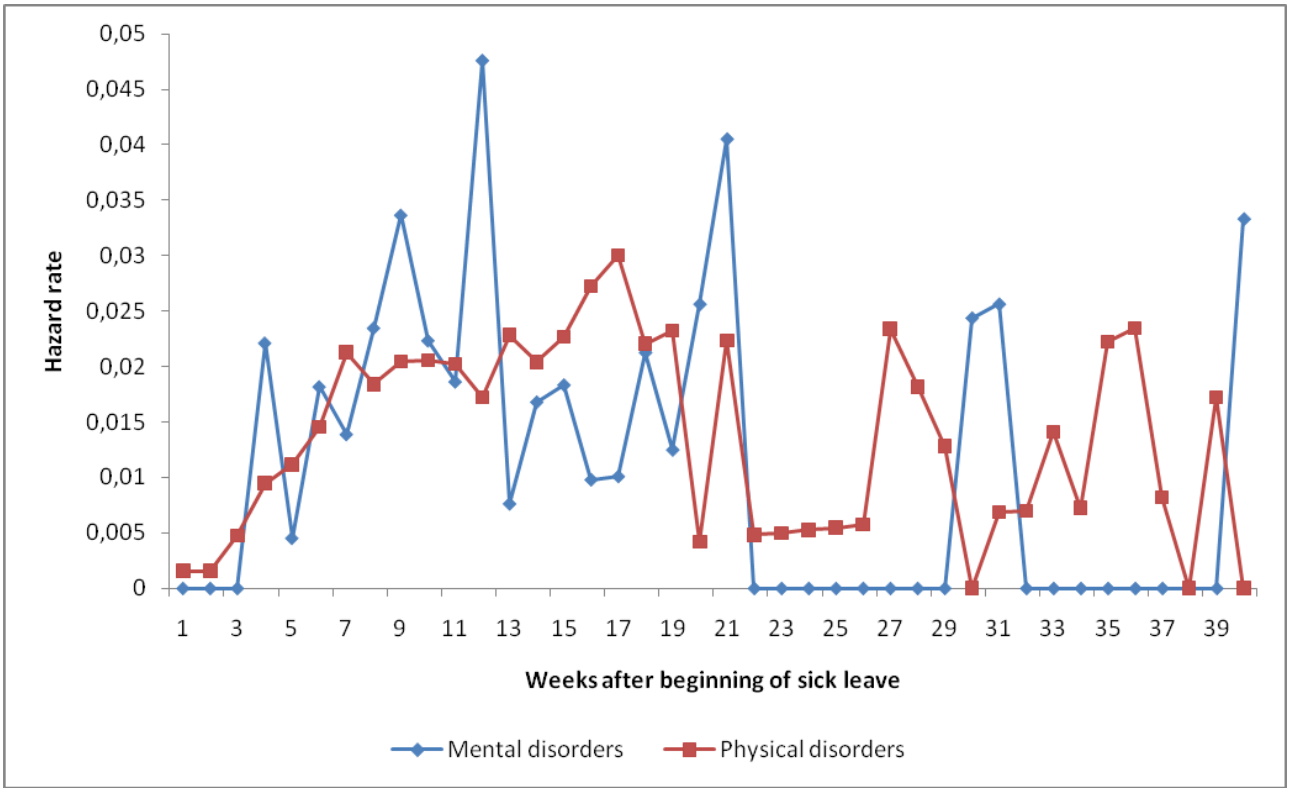

Fig. 1. Unadjusted hazard rate to part-time sick-listing for sick-listed employees with mental disorders and physical disorders.

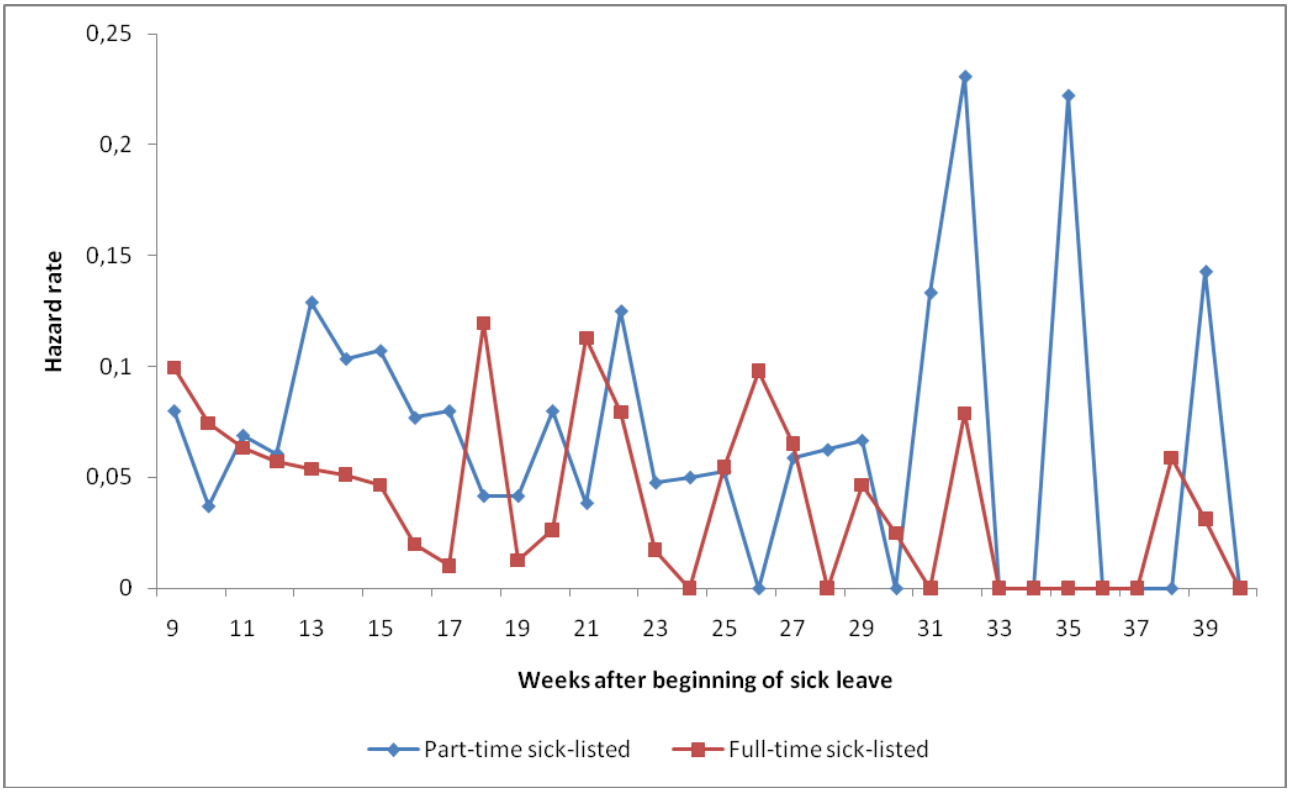

Fig. 2. Sick-listed employees with mental disorders: unadjusted hazard rate to regular working hours for part-time sick-listed and full-time sick-listed employees.

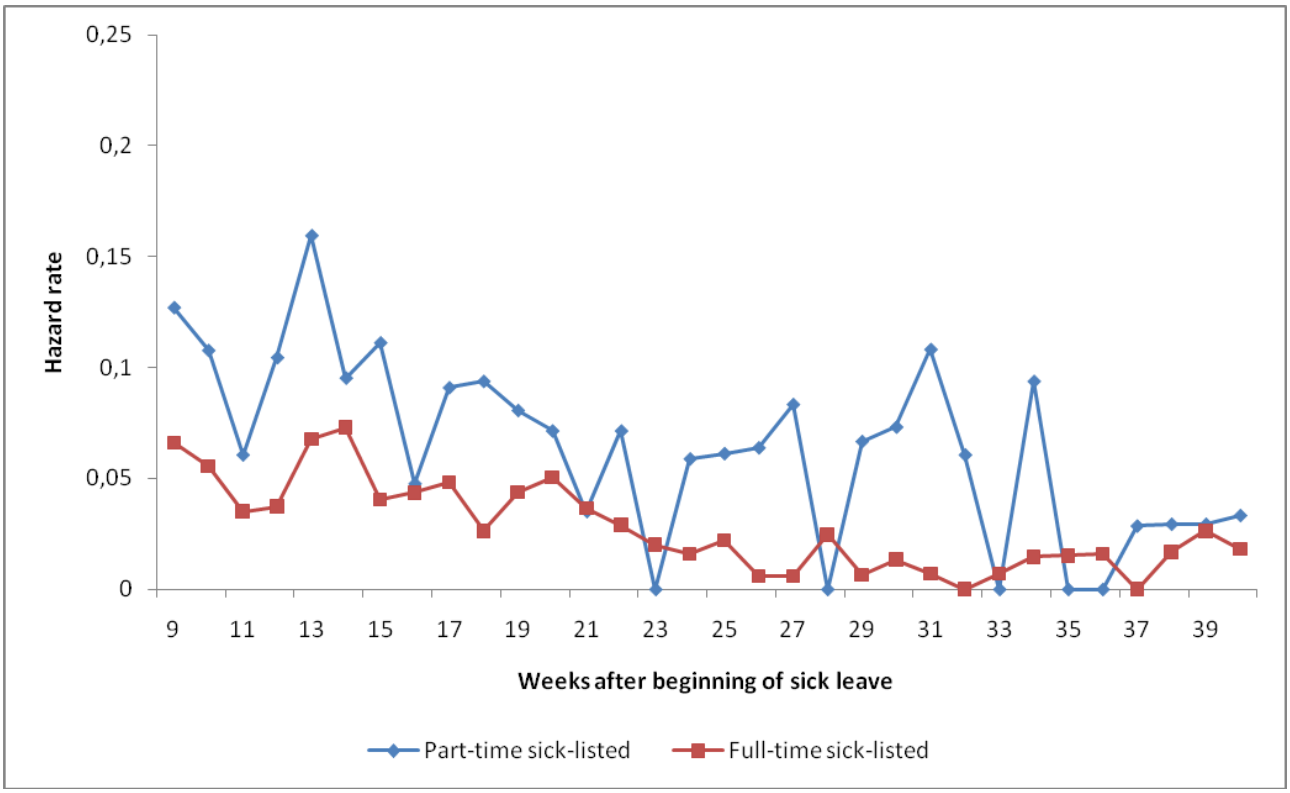

Fig. 3. Sick-listed employees with physical disorders: unadjusted hazard rate to regular working hours for part-time sick-listed and full-time sick-listed employees.

Table 1

Descriptive statistics for part-time and full-time sick-listed employees with mental disorders.

	Part-time sick-listed		*Full-time sick-listed*	
Variable	*Mean*	*Std.dev*	*Mean*	*Std.dev*
Returning to regular working hours	0.814	(0.393)	0.754	(0.432)
Visits to general practitioner in the year before the sick leave	7.932	(6.667)	8.048	(7.111)
Visits to medical specialists in the year before the sick leave*	0.678	(1.736)	1.323	(3.677)
Female (yes=1)*	0.814	(0.393)	0.683	(0.467)
Age	41.356	(10.070)	42.695	(10.471)
Primary education[a)] (yes=1)	0.220	(0.418)	0.251	(0.435)
Secondary education[a)] (yes=1)	0.288	(0.457)	0.359	(0.481)
Postsecondary education[a)] (yes=1)	0.492	(0.504)	0.389	(0.489)
Previous employment experience since 1964 (years employed)	17.878	(10.339)	17.563	(10.339)
Unemployment rate in %, 9-26th week	5.235	(1.164)	5.126	(1.116)
Unemployment rate in %, 27-52th week[b)]	5.118	(1.193)	5.236	(1.108)
Unemployment rate in %, 53-78th week[c)]	4.933	(1.421)	4.917	(0.703)
Unemployment rate in %, 79th week+	---	(---)	---	(---)

Note: Calculations based on 59 part-time sick-listed and 167 full-time sick-listed. a): Primary education covers the compulsory school period, i.e, nine years of basic school, and other preparatory schooling such as high school. Secondary education includes all 'terminal' education (preparing the students for entry directly into working life) except university degrees. Postsecondary education includes all types of university degrees. b): Calculation based on 22 part-time sick-listed and 41 full-time sick-listed with return-to-work durations longer than 26 weeks. c): Calculation based on 6 part-time sick-listed and 18 full-time sick-listed with return-to-work durations longer than 52 weeks. Significance levels: * significant at 10%, ** significant at 5%, *** significant at 1%.

Table 2

Descriptive statistics for part-time and full-time sick-listed employees with physical disorders.

	Part-time sick-listed		*Full-time sick-listed*	
Variable	*Mean*	*Std.dev*	*Mean*	*Std.dev*
Returning to regular working hours	0.636	(0.482)	0.682	(0.466)
Visits to general practitioner in the year before the sick leave	8.226	(7.098)	9.061	(8.424)
Visits to medical specialists in the year before the sick leave	0.759	(1.743)	0.817	(2.199)
Female (yes=1)*	0.610	(0.489)	0.551	(0.498)
Age*	45.446	(9.271)	43.887	(11.078)
Primary education[a)] (yes=1)***	0.282	(0.451)	0.401	(0.491)
Secondary education[a)] (yes=1)**	0.497	(0.501)	0.402	(0.491)
Postsecondary education[a)] (yes=1)	0.221	(0.416)	0.194	(0.396)
Previous employment experience since 1964 (years employed)***	20.027	(9.527)	17.645	(10.505)
Unemployment rate in %, 9-26th week	5.344	(1.187)	5.247	(1.120)
Unemployment rate in %, 27-52th week**[b)]	5.094	(1.235)	5.446	(1.135)
Unemployment rate in %, 53-78th week[c)]	5.015	(1.171)	5.411	(1.227)
Unemployment rate in %, 79th week+[d)]	4.880	(0.983)	5.563	(1.306)

Note: Calculations based on 195 part-time sick-listed and 443 full-time sick-listed. a): Primary education covers the compulsory school period, i.e, nine years of basic school, and other preparatory schooling such as high school. Secondary education includes all 'terminal' education (preparing the students for entry directly into working life) except university degrees. Postsecondary education includes all types of university degrees. b): Calculation based on 80 part-time sick-listed and 135 full-time sick-listed with return-to-work durations longer than 26 weeks. c): Calculation based on 26 part-time sick-listed and 56 full-time sick-listed with return-to-work durations longer than 52 weeks. d): Calculation based on 5 part-time sick-listed and 27 full-time sick-listed with return-to-work durations longer than 78 weeks.

Significance levels: * significant at 10%, ** significant at 5%, *** significant at 1%.

Table 3

Estimates (SE's) of the multivariate proportional hazard rate models.

	Mental illness		*Non-mental illness*	
Variable	*I. Part-time sick-listing*	*II. Return to regular working hours*	*III. Part-time sick-listing*	*IV. Return to regular working hours*
Part-time sick-listed	-- --	0.454 (0.197)**	-- --	0.694 (0.121)***
Ended part-time sick-listing	-- --	0.240 (0.415)	-- --	0.566 (0.287)**
Visits to general practitioner	-0.002 (0.020)	-0.017 (0.012)	-0.021 (0.011)**	-0.024 (0.008)***
Visits to medical specialists	-0.081 (0.066)	-0.025 (0.026)	-0.018 (0.039)	-0.035 (0.032)
Female	0.698 (0.365)*	-0.251 (0.190)	0.336 (0.156)**	0.041 (0.108)
Age	-0.021 (0.105)	0.026 (0.061)	0.125 (0.066)*	-0.061 (0.037)*
Age*2[a)]	-0.080 (0.127)	-0.032 (0.075)	-0.173 (0.076)**	0.046 (0.044)
Secondary education	-0.065 (0.390)	0.176 (0.228)	0.401 (0.172)**	-0.089 (0.117)
Postsecondary education	0.571 (0.364)	0.218 (0.220)	0.434 (0.209)**	0.240 (0.142)*
Employment experience	0.080 (0.029)***	-0.007 (0.016)	0.038 (0.011)***	0.026 (0.008)***
Unemployment rate	-0.029 (0.121)	-0.323 (0.082)***	-0.083 (0.065)	-0.268 (0.048)***
Baseline, period 2[b)]	1.144 (0.326)***	-0.303 (0.203)	0.705 (0.212)***	0.073 (0.124)
Baseline, period 3[b)]	0.399 (0.400)	-0.413 (0.200)**	0.937 (0.196)***	-0.827 (0.140)***
Baseline, period 4[b)]	-0.254 (0.403)	-1.692 (0.338)***	-0.115 (0.207)	-1.705 (0.193)***
Constant	-4.202 (2.071)**	-1.165 (1.198)	-7.140 (1.387)***	-0.119 (0.765)

Note: N=864. The hazard rate models are estimated simultaneously. See Table 1 for further information about the variables. Coefficients in columns I & II and III & IV, respectively, are estimated simultaneously. a): Coefficient multiplied by 100. b): Baseline hazards in the equation for graded return to work: Period 1: <9 weeks (reference), period 2: 9-12 weeks, period 3: 13-19 weeks, period 4: >19 weeks. Baseline hazards in the equation for returning to regular working hours: Period 1: <13 weeks (reference), period 2: 13-19 weeks, period 3: 20-39 weeks, period 4: >39 weeks. Significance levels: *** significant at 1%, ** significant at 5%, * significant at 10%.

Table 4

Estimates (SE's) of the multivariate mixed-proportional hazard rate models.

	Mental illness		*Non-mental illness*	
Variable	*I. Part-time sick-listing*	*II. Return to regular working hours*	*III. Part-time sick-listing*	*IV. Return to regular working hours*
Part-time sick-listed	-- --	-0.123 (0.238)	-- --	0.442 (0.208)**
Ended part-time sick-listing	-- --	0.018 (0.474)	-- --	0.436 (0.320)
Visits to general practitioner	0.006 (0.021)	-0.002 (0.018)	-0.021 (0.011)**	-0.031 (0.013)**
Visits to medical specialists	-0.089 (0.064)	-0.058 (0.030)*	-0.025 (0.040)	-0.064 (0.048)
Female	0.746 (0.368)**	-0.290 (0.243)	0.348 (0.159)**	0.109 (0.153)
Age	-0.017 (0.111)	0.064 (0.083)	0.115 (0.067)*	-0.110 (0.054)**
Age*2[a)]	-0.076 (0.132)	-0.006 (0.098)	-0.163 (0.077)**	0.087 (0.064)
Secondary education	0.050 (0.392)	0.339 (0.279)	0.418 (0.174)**	-0.047 (0.162)
Postsecondary education	0.485 (0.369)	0.054 (0.279)	0.459 (0.213)**	0.421 (0.195)**
Employment experience	0.075 (0.029)***	-0.016 (0.020)	0.040 (0.012)***	0.042 (0.011)***
Unemployment rate	-0.068 (0.122)	-0.467 (0.095)***	-0.102 (0.067)	-0.419 (0.072)***
Baseline, period 2[b)]	1.197 (0.327)***	-0.077 (0.211)	0.799 (0.218)***	1.091 (0.298)***
Baseline, period 3[b)]	0.545 (0.405)	0.480 (0.259)*	1.219 (0.240)***	0.651 (0.349)*
Baseline, period 4[b)]	0.503 (0.483)	0.584 (0.705)	0.247 (0.276)	-0.164 (0.365)
Constant	-4.086 (2.211)*	-0.983 (1.590)	-6.270 (1.435)***	3.237 (1.177)***
Random effects	-1.447 (0.557)***	-3.174 (0.653)***	-0.961 (0.358)***	-3.030 (0.398)***
Fraction of observations with random effect	0.062 (0.043)		0.729 (0.151)	

Note: N=864. The hazard rate models are estimated simultaneously. See Table 1 for further information about the variables. Coefficients in columns I & II and III & IV, respectively, are estimated simultaneously. a): Coefficient multiplied by 100. b): Baseline hazards in the equation for graded return to work: Period 1: <9 weeks (reference), period 2: 9-12 weeks, period 3: 13-19 weeks, period 4: >19 weeks. Baseline hazards in the equation for returning to regular working hours: Period 1: <13 weeks (reference), period 2: 13-19 weeks, period 3: 20-39 weeks, period 4: >39 weeks. Significance levels: *** significant at 1%, ** significant at 5%, * significant at 10%.